

Tested Light Source - 1_PHOT_NINETY-NINE-2000lmChip-2700K-WallWash-HoneycombLouvre_2309

Laboratory and Equipment

Laboratory Owner and Location	Factorylux, Greenhill Mills, Hebden Bridge, HX7 5QF, UK
Goniospectrometer System and Type	BaseSpion – Type C, horizontal
Spectrometer Manufacturer and Model	Ibsen Photonics, Denmark – Freedom VIS (Custom Viso)

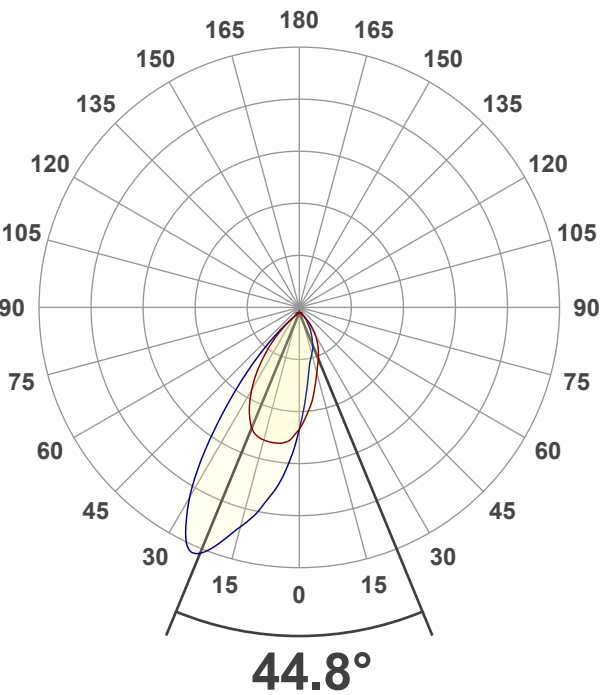
Measurement Conditions

Number of C-planes and Resolution	24 planes – 15°
γ (gamma)-Resolution	1.5°
Test Distance	1.50 m
Input Power, Power and Displ. Factors	16.0 W – PF 0.99 – DPF 0.99
Input RMS Voltage and Current	240 V – 0.068 A
Frequency of Input Power	50 Hz

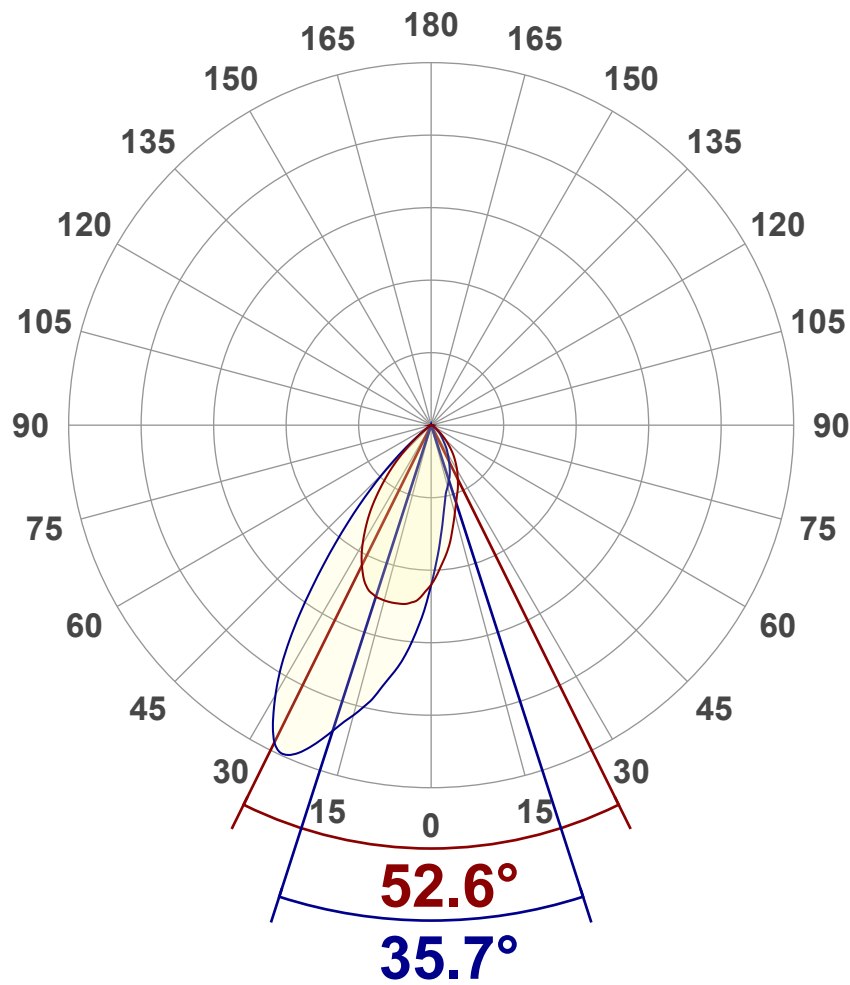
Main Light Measurement Results

Output	505 lm
Efficiency	31 lm/W
Peak Intensity and Beam Angle	819 cd – 44.8°
Color Rendering Index	CRI 91.8

Light Intensity Distribution



Luminous Intensity diagramUnit: 0-100% of peak intensity



Main Values	
Output (total Lumen)	505 lm
Peak Intensity	819 cd
Beam Angle (50%)	44.8°
Beam Angle (90%)	35.7°
Beam Angle (10%)	57.8°

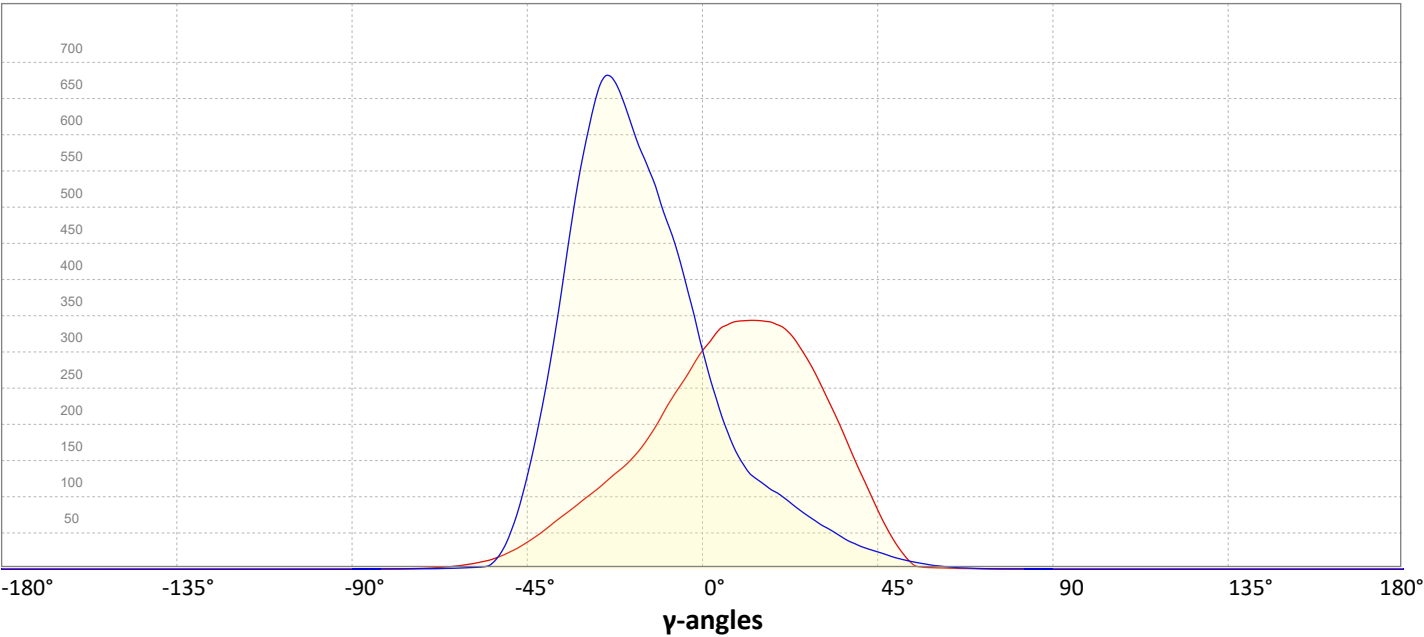
Cut-off Angle	
Average 2,5%	107.3°

Field Angle	
Average 10%	86.9°

Intensity Ratio	
In 120° cone	99.3%
In 90° cone	92.8%

C000-C180
C090-C270

Linear distribution diagram - Intensity (candela) vs γ-angle

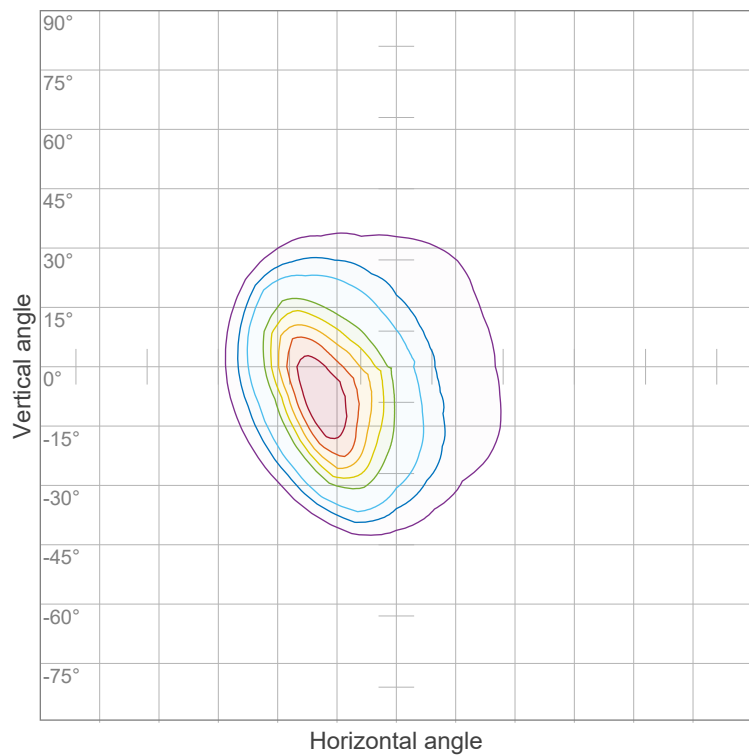


Goniophotometry Report

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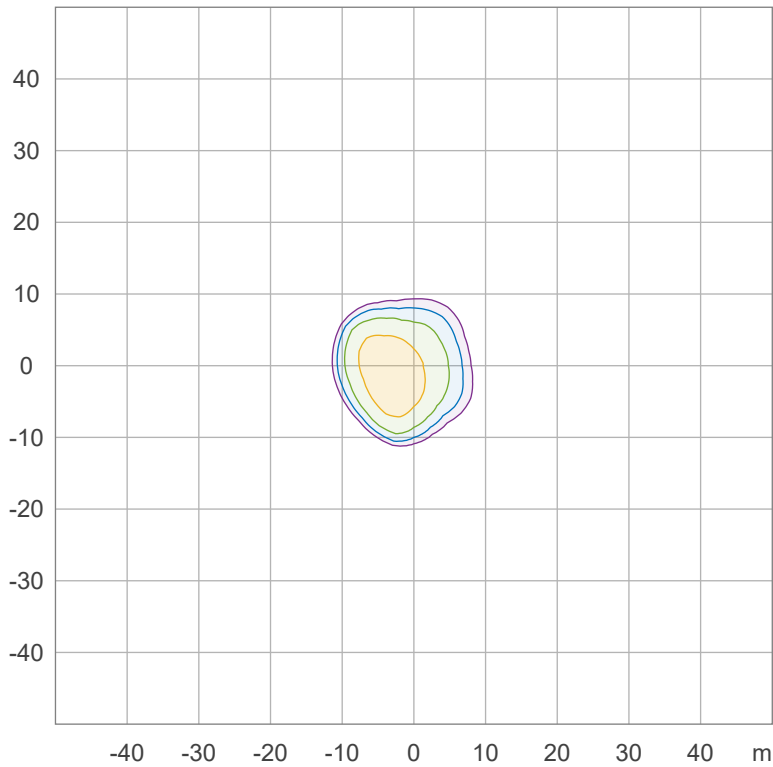
Iso-intensity Diagram (Iso-candela)



90 %	736.4 cd
80 %	654.6 cd
70 %	572.8 cd
60 %	491.0 cd
50 %	409.1 cd
40 %	327.3 cd
30 %	245.5 cd
20 %	163.7 cd
10 %	81.8 cd

Peak intensity: 818.3 cd
Number of c-planes: 24

Iso-illuminance Diagram (Iso-lux)



50.0 %	3.3 lx
30.0 %	2.0 lx
10.0 %	0.7 lx
5.0 %	0.3 lx
3.0 %	0.2 lx

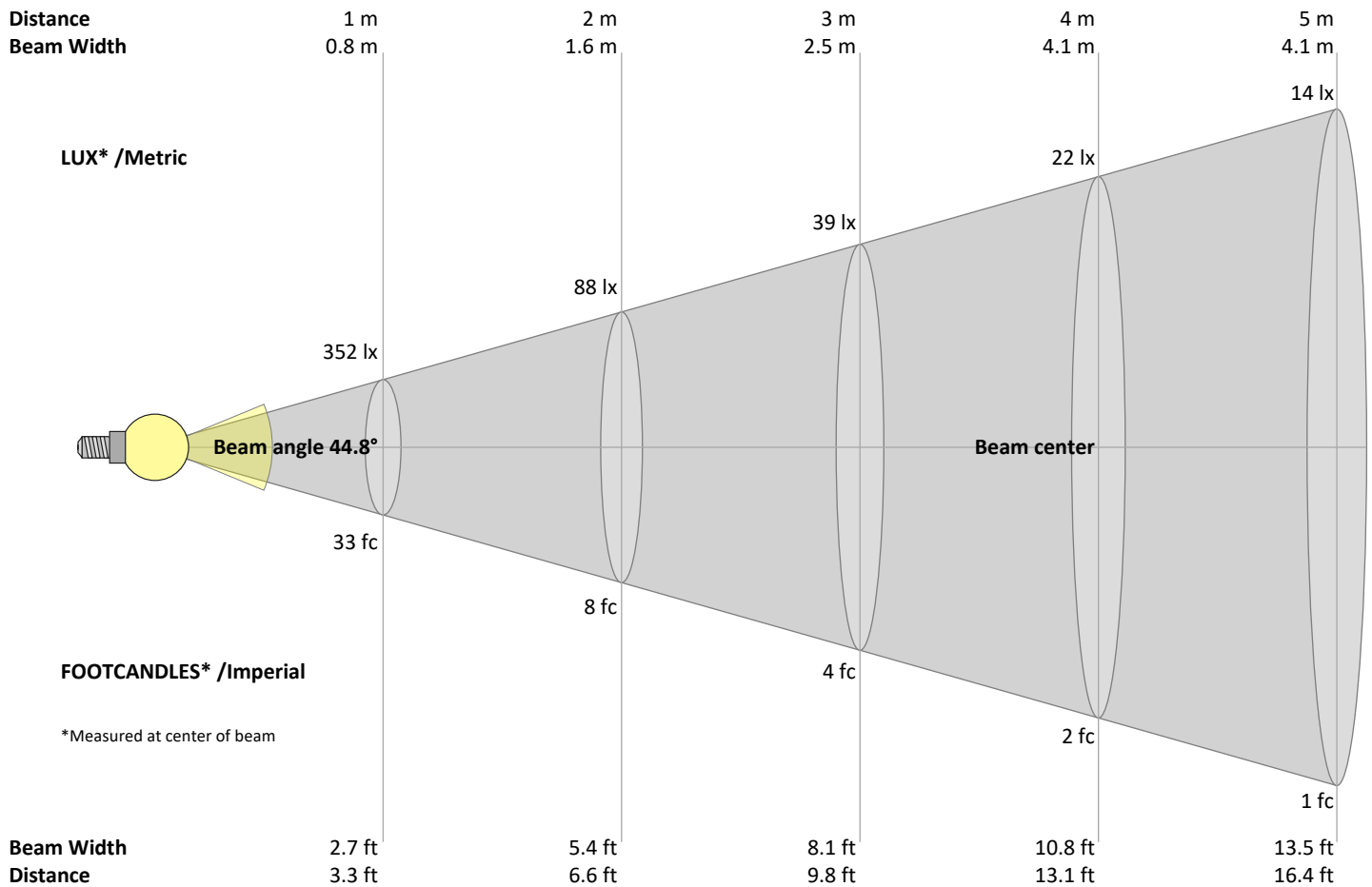
Peak illuminance: 6.7 lx
Mounting height: 10.0 m
Number of c-planes: 24

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Beam Details



Beam intensities from 1 – 20 m

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	m
3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6	ft
352	88	39	22	14	10	7	5	4	4	3	2	2	2	2	1	1	1	1	1	lux
32.7	8.2	3.6	2	1.3	0.9	0.7	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	fc

Intensities in 0° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
352	329	308	289	270	249	227	208	191	177	164	154	144	133	123	113	103	94	84	75	cd
100%	94%	88%	82%	77%	71%	65%	59%	54%	50%	47%	44%	41%	38%	35%	32%	29%	27%	24%	21%	of 0°val

Intensities in 90° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
352	303	262	226	195	172	153	143	134	125	118	109	99	90	81	73	66	58	50	43	cd
100%	86%	75%	64%	55%	49%	44%	41%	38%	36%	34%	31%	28%	25%	23%	21%	19%	17%	14%	12%	of 0°val

Intensities in 180° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
352	363	379	388	393	395	396	396	395	393	387	378	363	344	323	299	273	247	219	190	cd
100%	103%	108%	110%	112%	112%	113%	113%	112%	112%	110%	107%	103%	98%	92%	85%	78%	70%	62%	54%	of 0°val

Intensities in 270° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
352	401	448	495	535	569	609	640	669	703	739	771	785	775	735	679	615	536	451	371	cd
100%	114%	128%	141%	152%	162%	173%	182%	190%	200%	210%	219%	223%	220%	209%	193%	175%	152%	128%	105%	of 0°val

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[illegible]

Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	33 lm	6.6%
10-20°	99 lm	19.7%
20-30°	155 lm	30.6%
30-40°	139 lm	27.6%
40-50°	64 lm	12.6%
50-60°	11 lm	2.2%
60-70°	3 lm	0.5%
70-80°	1 lm	0.1%
80-90°	0 lm	0.1%
90-100°	0 lm	0.0%
100-110°	0 lm	0.0%
110-120°	0 lm	0.0%
120-130°	0 lm	0.0%
130-140°	0 lm	0.0%
140-150°	0 lm	0.0%
150-160°	0 lm	0.0%
160-170°	0 lm	0.0%
170-180°	0 lm	0.0%
Total	505 lm	100.0%

Intensity peaks

Max intensity	819 cd
Intensity, 90°	0 cd
Intensity, 0°	352 cd

Zonal Lumen summary

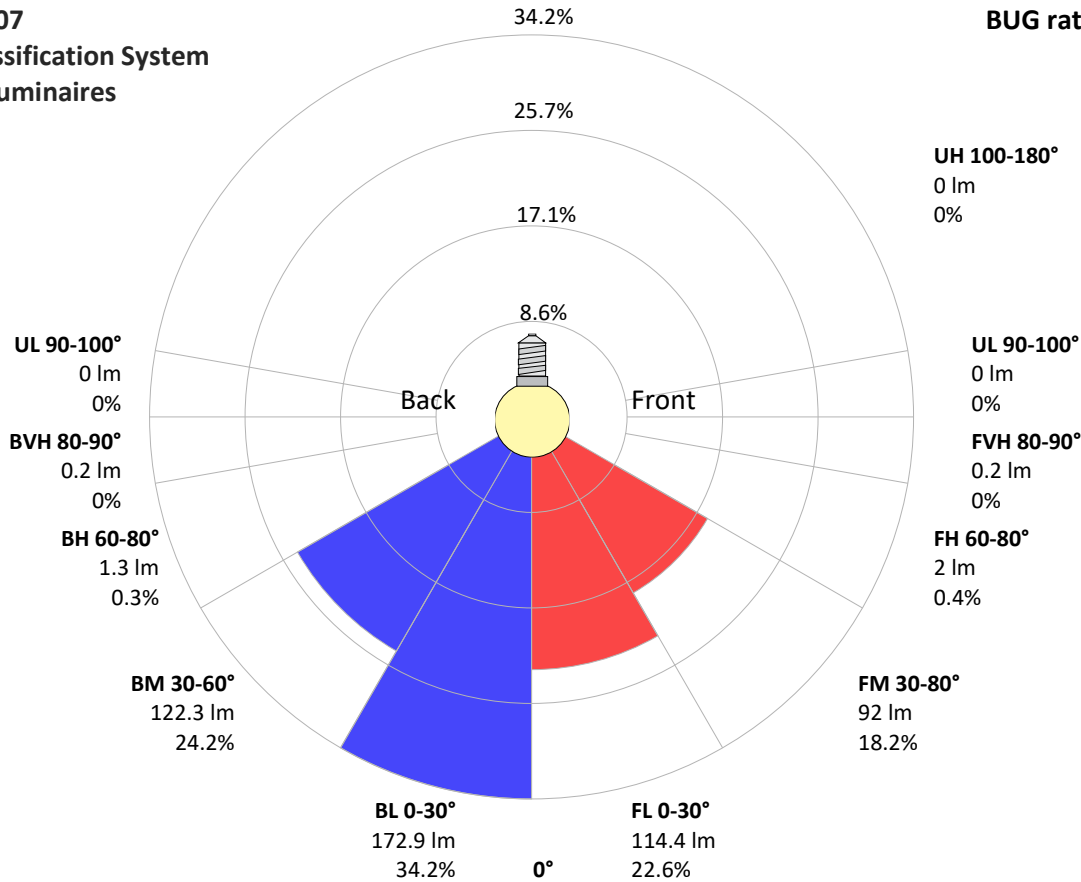
Zone (γ)	Lumen	% Total
0-30°	287 lm	56.9%
0-40°	427 lm	84.5%
0-60°	501 lm	99.3%
60-90°	4 lm	0.7%
70-100°	1 lm	0.2%
90-120°	0 lm	0.0%
0-90°	505 lm	100.0%
90-180°	0 lm	0.0%
0-180°	505 lm	100.0%

BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	114 lm	22.6%
Medium(30-60°)	92 lm	18.2%
High(60-80°)	2 lm	0.4%
Very high(80-90°)	0 lm	0.0%
Back light		
Low(0-30°)	173 lm	34.2%
Medium(30-60°)	122 lm	24.2%
High(60-80°)	1 lm	0.3%
Very high(80-90°)	0 lm	0.0%
Uplight		
Low(90-100°)	0 lm	0.0%
High(100-180°)	0 lm	0.0%

IESNA TM-15-07
Luminaire Classification System
For Outdoor Luminaires

BUG rating B1 U1 G0



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Power Details

Input Power

Power feed to light source	16.0 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	240 V
RMS Input current feed, I_{RMS}	0.068 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	16.24 VA
Displacement factor of AC power feed	0.99
Power factor of AC current feed	0.99
Total harmonic distortion of the current	6.55%
Total harmonic distortion of the voltage	1.09%

Efficiency

Radiated power efficiency	11.6%
Lumen efficiency	31 lm/W

Input Power Curve



Goniophotometry Report

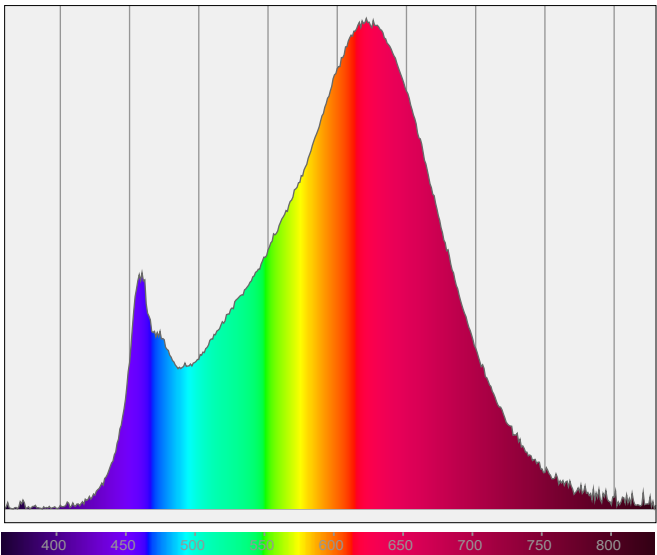
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Color Measurements

Correlated Color Temperature	CCT = 2700 K
Color Rendering TM30-18	R _f 90.7 — R _g 98.6
Color Shift, CIE duv	Duv ±0.0003

Spectral distribution



Color details

Correlated Color Temperature	CCT = 2700 K	Color coordinates CIE 1931	(x;y) = (0.460;0.411)
Color Rendering Index	CRI 91.8	Color coordinate CIEs 1960	(u;v) = (0.263;0.352)
Color Rendering Index, R9 (red component)	R9 = 65.1	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R _f 90.7 — R _g 98.6	Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0.263;0.263)
Color Quality Scale	CQS = 89.9		

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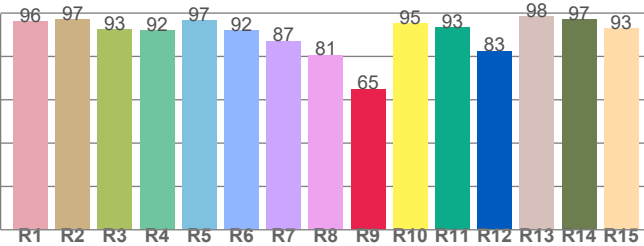
CIE 1931



CIE 1931 – zoomed on Planckian locus



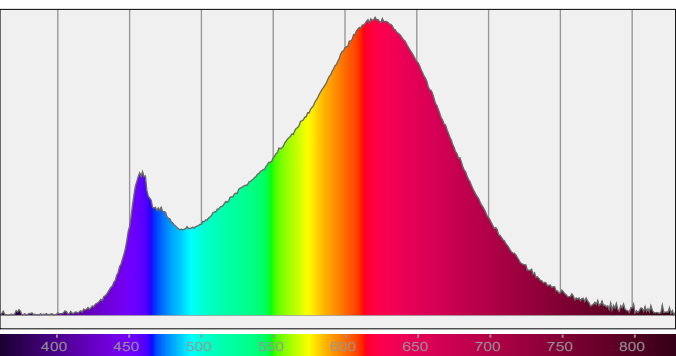
Color Rendering Index per reference color (CIE 1995)



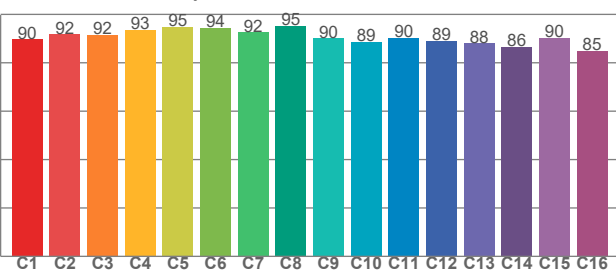
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
96.2	97.0	92.6	92.1	96.7	92.2	87.1	80.7	65.1	95.3	93.3	82.6	98.4	97.1	92.9

Spectral power distribution (SPD) / W/nm – 0-100%



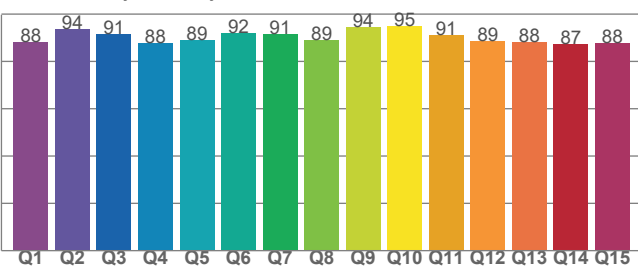
TM30-18 Rf-values per hue bin



TM30 C values, 16 binned values out of total of 99 C values

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
89.6	91.7	91.6	93.5	94.8	94.4	92.5	95.0	90.1	88.7	90.3	89.1	88.0	86.4	90.1	84.9

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
88.0	93.6	91.3	87.8	88.9	91.9	91.4	89.2	94.3	94.8	91.2	88.7	88.0	87.4	87.6